

REMARKS/ARGUMENTS

This Amendment is being filed in response to the Official Action of June 16, 2006. Following restriction, the present application includes pending Claims 1-15 under consideration. Initially, Applicant notes with appreciation the indication that Claims 7, 8 and 15 are allowable. Nonetheless, the Official Action rejects Claims 1-6 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication No. 2005/0111804 to Bjarklev et al., in view of U.S. Patent No. 6,377,591 to Hollister et al. The first Official Action then rejects the remaining claims, namely Claims 9-14, under 35 U.S.C. § 103(a) as being unpatentable over Bjarklev in view of Hollister, and further in view of U.S. Patent Application Publication No. 2004/0081420 to Nasiri et al. As explained below, however, Applicant respectfully submits that the claimed invention is patentably distinct from Bjarklev, Hollister and Nasiri, taken individually or in combination. Accordingly, Applicant respectfully traverses the rejections of the claims. Nonetheless, Applicants have amended independent Claim 9 to further clarify the claimed invention. In view of the amendment to Claim 9, and the remarks presented herein, Applicant respectfully requests reconsideration and allowance of all of the pending claims of the present application.

Briefly, Bjarklev discloses a composite material photonic crystal fiber (spelled “fibre” in Bjarklev) for transmission of light at a predetermined wavelength. As disclosed, the optical fiber includes a core region, an inner cladding region and an outer cladding region. The inner cladding region has spaced apart voids, at least some of which are at least partly filled with a fluid substance to modify a refractive index in the cross-section of the fiber. In this regard, the fluid substance may be introduced by preparing and fixing the fiber ends, identifying the voids to be filled and infusing the fluid therein while masking openings in the remaining voids. By selective heating of parts of the fiber, the location of the fluid substance in the void may be controlled to extend over only a fraction of the length of the void that extends the length of the fiber.

A. Claims 1 – 6 are Patentable over Bjarklev in view of Hollister

According to a first aspect of the claimed invention, as reflected for example by

independent Claim 1, a system is provided for cooling a fiber amplifier. As recited, the system includes a fiber amplifier assembly with a longitudinally-extending fiber amplifier, and a jacket surrounding the fiber amplifier and extending at least partially longitudinally therealong. The jacket surrounds the fiber amplifier such that the fiber amplifier assembly defines a passage between the jacket and the fiber amplifier for the circulation of coolant therethrough. In this regard, the fiber amplifier assembly further includes a retaining structure disposed within the passage defined by the fiber amplifier assembly for at least partially maintaining spacing between the fiber amplifier and jacket, where the retaining structure and coolant comprise an emulsion of phase change material.

In contrast to the first aspect of the claimed invention, none of the cited references, taken individually or in combination, teach or suggest a fiber amplifier assembly including a fiber amplifier and a jacket surrounding the fiber amplifier to thereby define a passage for the circulation of coolant, and further including a retaining structure within the passage for at least partially maintaining spacing between the fiber amplifier and the jacket. The first Official Action alleges that Bjarklev discloses this feature of the claimed invention. Bjarklev does disclose fibers with cladding and/or core regions including a number of spaced-apart voids, at least some of which are at least partially filled with an active material. Bjarklev does not teach or suggest, however, that any of those voids are defined by a jacket surrounding a fiber amplifier, similar to the passage of the claimed invention. In addition, Bjarklev does not teach or suggest that any of the voids include a retaining structure for at least partially maintaining spacing between the fiber amplifier and the jacket, similar to the assembly of the claimed invention.

Moreover, and as conceded by the first Official Action, Bjarklev does not teach or suggest that the retaining structure and coolant comprise an emulsion of phase change material. For this element of the claimed invention, the Official Action cites Hollister, and alleges that Hollister supports the use of phase change material to improve cooling system performance, thereby providing motivation to modify the fiber of Bjarklev to include phase change material. Hollister does disclose use of phase change material as a coolant for an optical amplification module. Contrary to the allegation of the Official Action, however, Hollister does not teach or suggest that phase change material itself provides any better cooling system performance than

any other coolant. Accordingly, neither Hollister nor the knowledge of one skilled in the art nor the nature of the problem to be solved provides the motivation or suggestion that is necessary to modify Bjarklev in the manner suggested by the Official Action.

For at least the foregoing reasons, Applicant respectfully submits that independent Claim 1, and by dependency Claims 2-6, is patentably distinct from Bjarklev and Hollister, taken individually or in combination. Accordingly, Applicant also respectfully submits that the rejection of Claims 1-6 as being unpatentable over Bjarklev in view of Hollister is overcome.

B. Claims 9 – 14 are Patentable over Bjarklev in view of Hollister and Nasiri

According to a second aspect of the claimed invention, as reflected for example by amended independent Claim 9, a system for cooling a fiber amplifier includes a fiber amplifier assembly with at least one sheet spacer and a longitudinally-extending fiber amplifier. As recited, the longitudinally-extending fiber amplifier is mounted in a serpentine manner through the sheet spacer(s) to thereby maintain separation between portions of the fiber amplifier, and to define a passage between the portions of the fiber amplifier for the circulation of coolant therethrough.

In contrast to this second aspect of the claimed invention, and as conceded in the Official Action, neither Bjarklev nor Hollister, taken individually or in combination, teach or suggest a sheet spacer through which a fiber amplifier may be mounted in a serpentine manner. Nonetheless, the Official Action alleges that Nasiri discloses this feature of the claimed invention, and that one skilled in the art would have found it obvious to modify the combination of Bjarklev and Hollister to further include the sheet spacer of Nasiri to teach the claimed invention. As motivation, the Official Action alleges that such a sheet spacer is “a satisfactory means to hold a fiber array.” Applicant respectfully disagrees, and submits that even if the cited references do disclose features of the claimed invention as alleged (although expressly not admitted), the Official Action has failed to establish *prima facie* obviousness of the claimed invention.

As stated in the MPEP, establishing *prima facie* obviousness of a claimed invention requires some suggestion or motivation to modify the references or to combine reference

teachings.” MPEP at § 2143.01. The Official Action alleges that one skilled in the art would find it obvious to modify Bjarklev/Hollister to include a sheet spacer through which a fiber amplifier may be mounted (as attributed to Nasiri) since such sheet spacers are satisfactory for holding a fiber array. However, as stated in the MPEP, “the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.” *Id.* (citing *In re Mills*, 916 F.2d 680 (Fed. Cir. 1990)) (emphasis added). In addition, as has been held by the Board of Patent Appeals and Interferences, and noted in the MPEP, the mere fact that one skilled in the art could adapt the reference device to meet the terms of a claim is not by itself sufficient to support a finding of obviousness. The prior art must also provide a motivation or reason for one skilled in the art, without the benefit of applicant’s specification, to make the necessary modifications to the reference device. MPEP 2144.04(VI.)(C.) (citing *Ex parte Chicago Rawhide Mfg. Co.*, 223 USPQ 351, 353 (Bd. Pat. App. & Inter. 1984). Thus, Applicant respectfully submits that a conclusory statement that it would have been obvious to modify the prior art to disclose the claimed invention because the modification is satisfactory does not by itself render obvious the claimed invention. Indeed, it is submitted that none of the cited references nor knowledge of one skilled in the art nor the nature of the problem to be solved provide the requisite motivation or suggestion to combine the references in the manner suggested by the Official Action.

For at least the foregoing reasons, Applicant respectfully submits that amended independent Claim 9, and by dependency Claims 10-14, is patentably distinct from Bjarklev in view of Hollister and Nasiri. Accordingly, Applicant also respectfully submits that the rejection of Claims 10-14 as being unpatentable over Bjarklev in view of Hollister and Nasiri is overcome.

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Amdt. dated December 15, 2006
Reply to Official Action of June 16, 2006

CONCLUSION

In view of the amendment to Claim 9, and the remarks presented above, Applicant respectfully submits that the present application is in condition for allowance. As such, the issuance of a Notice of Allowance is therefore respectfully requested. In order to expedite the examination of the present application, the Examiner is encouraged to contact Applicant's undersigned attorney in order to resolve any remaining issues.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,



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